NEW ZEALAND ANTARCTIC RESEARCH PROGRAMME 1981-82

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and report of 1980-81 programme

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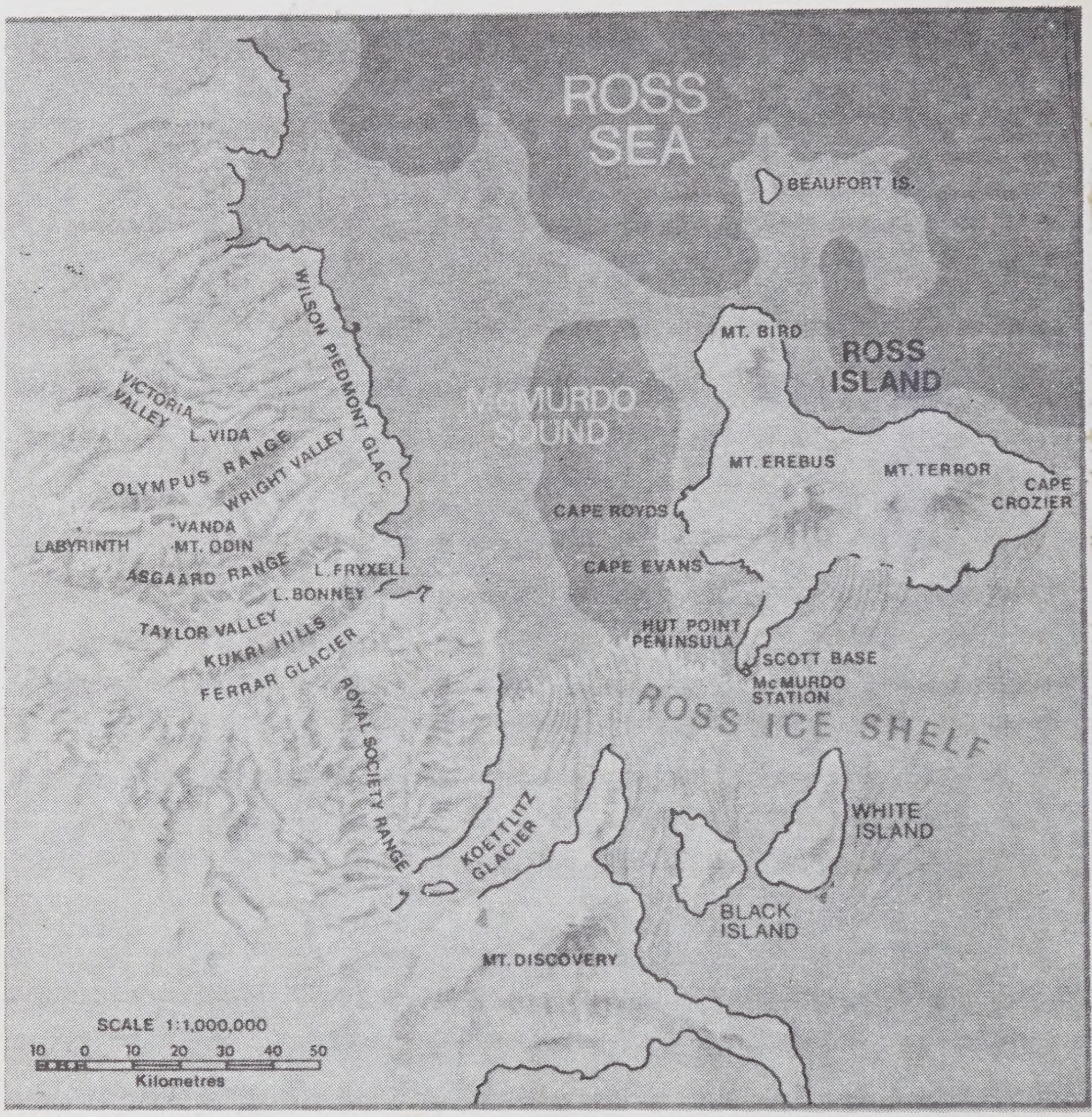
Pam: (*7) NZARP 1981-82

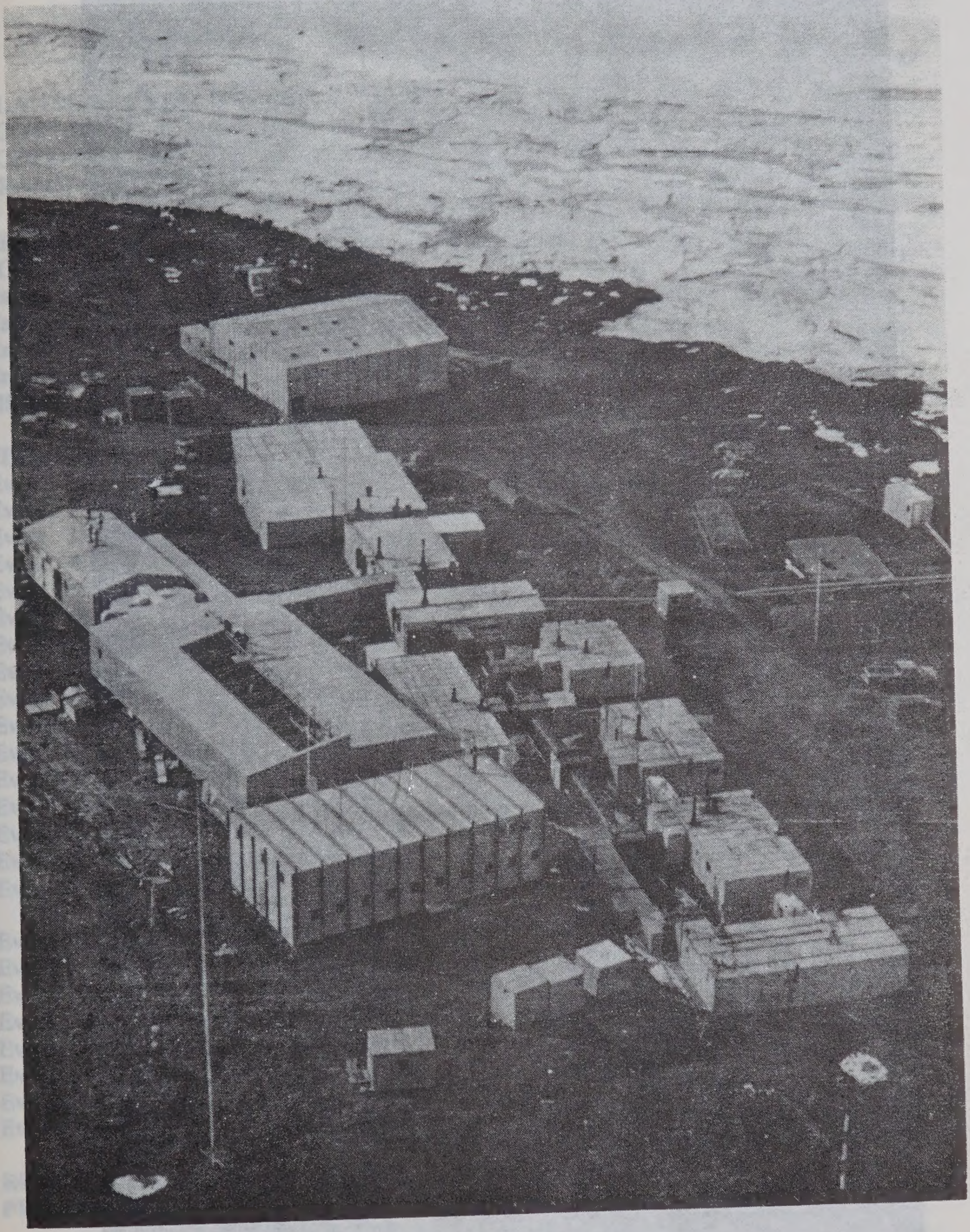
Published July 1981

Antarctic Division D.S.I.R.

ISSN-0010-7240 NZ

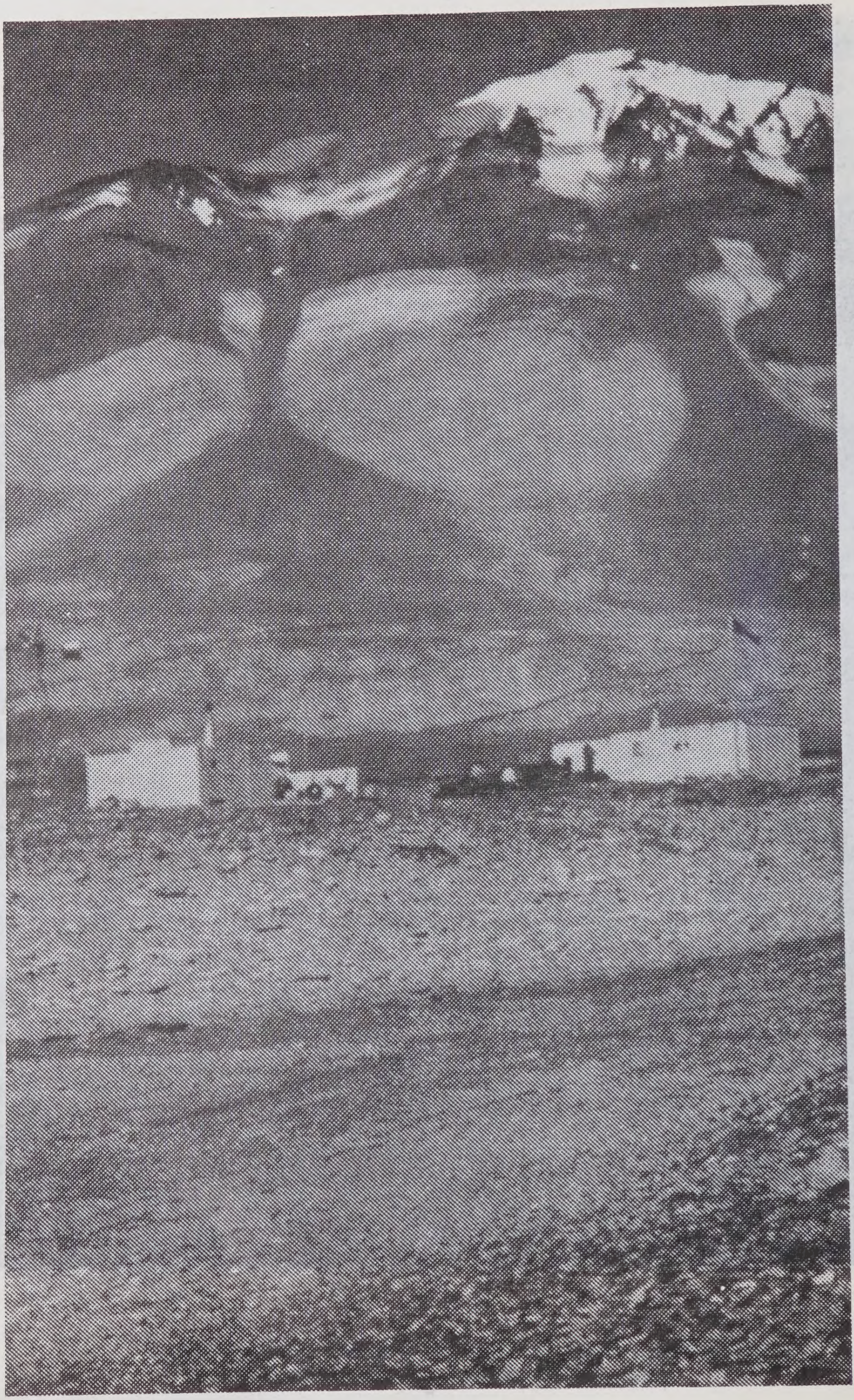


Map depicts Ross Island and Dry Valleys region where the main thrust of the New Zealand Antarctic research programme is centered.



Scott Base, Ross Island, Antarctica. January 1981.
(New Base Buildings, left centre)

Rec'd: Oct 7/81
Order No.:
Price:
Acc. No.: N.Z. Antarctic Research Program



Vanda Station, Dry Valleys Region, Victoria Land.

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NEW ZEALAND ANTARCTIC RESEARCH PROGRAMME (NZARP) 1981-82

PLANNING AND OPERATION

The Ross Dependency Research Committee formulates the New Zealand Antarctic Research Programme. The Committee comprises representatives of Divisions of the Department of Scientific and Industrial Research, the Lands and Survey, the Dominion Museum, the Royal Society of New Zealand, New Zealand Universities, the Chiefs of Staff of the New Zealand Armed Forces, and the Department of Foreign Affairs. It is representative of all scientific disciplines with Antarctic interests.

Antarctic Division, DSIR, is responsible for detailed planning and implements the programme. The Division employs staff and obtains supplies and equipment for all Government projects. University projects are financed and equipped from University sources. The operation and control of all projects is directed by the Antarctic Division through the Officer-in-Charge, Scott Base.

SCOTT BASE

On January 20th, 1982, special celebrations will mark the 25th Anniversary of the opening of Scott Base. It was on January 20th, 1957 that the base was officially commissioned as a scientific support station for the New Zealand research programme being undertaken in Antarctica during the International Geophysical Year (IGY) 1957/58. At that time Scott Base also served as a staging point for the Trans-Antarctic Expedition.

Sited at Pram Point on the southern tip of Ross Island, (Latitude 77 ° 51 ′ S) Scott Base is only three kilometres from the main American base — McMurdo Station.

The number of buildings has increased from seven to twelve and all are inter connected by covered walkways. These allow free movement around the base without exposure to the weather, and modular construction minimises the ever-present fire risk.

Eleven men are expected to winter over at Scott Base in 1982. The team will comprise: the O.I.C., science technicians, base engineer, electrician, mechanic, postmaster, post office technician, chef and field leader/doghandler.

Base and field staff will increase to 36, including three at Vanda Station, during the summer months. In all, there will be 160 personnel involved in the summer scientific programme, construction activities and base operations.

SCOTT BASE REBUILDING PROGRAMME

During the past two decades, Scott Base buildings have been modified to accommodate the needs of the expanding New Zealand science programmes undertaken in Antarctica.

A new base rebuilding programme was initiated in 1976/77 with the construction of the bio-laboratory. Facilities provided within this complex include a scientific laboratory, lounge area, the base library and additional accommodation for 20 people.

Stage 2 of rebuilding was completed during the 1978/79 season with the commissioning of the new power house. Power supply is generated by two 135 KVA three phase Caterpillar Alternator units driven by Caterpillar 3306 diesel engines.

1979/80 saw the installation of a reverse osmosis desalination plant into the power house complex, which when fully operational will provide the base with a fresh water supply capacity of 6500 litres per day.

During this past season, 1980/81, the outer shell of a new accommodation and ablutions block was completed by Antarctic Division, DSIR and Ministry of Works and Developments construction teams. Internal finishing of this building will be completed during the early part of the current summer season. This building, Stage 3A of the reconstruction programme, will be commissioned in December 1981 and officially opened as part of the 25th Scott Base anniversary celebration, on January 20th, 1982. This important addition to the base will expand accommodation facilities for up to eighty persons.

Work will also commence this season on site preparation for stage 3B, a new kitchen and mess area. This project will be supervised by the Ministry of Works and Development and undertaken by a New Zealand Army construction team.

TRANSPORT

From the time of the International Geophysical Year, 1957/58, through to 1960, air support within Antarctica for the New Zealand research programme was provided by the Antarctic Flight of the Royal New Zealand Air Force.

Subsequently, generous logistics support has been available through the U.S. Antarctic Programme under U.S./N.Z. Government to Government agreement, which also provides the U.S. with base facilities in Christchurch.

During the 1981/82 season, the RNZAF will fly 12 Hercules C130 missions to Antarctica, constituting the main New Zealand contribution to the U.S./N.Z. logistics pool. The RNZAF will operate a pilot exchange scheme including two helicopter crews which will be attached to the U.S. Navy VXE-6 squadron flying field missions within Antarctica. Additionally, RNZAF and New Zealand Army cargo handling teams will operate at both Christchurch and McMurdo throughout the summer.

Following the pattern of the past three seasons, RAAF Hercules aircraft will again be contributing to the U.S./N.Z. Logistics pool under a tripartite agreement which allows Australian personnel to be air transported via Christchurch and McMurdo to the main Australian Antarctic base at Casey.

Ground Transport: Scott Base

1 D4 Caterpillar Tractor
1 920 Caterpillar FEL Tractor
3 Snow-Trac Vehicles
8 Snow-Tric Toboggans
1 Landrover
1 Dodge — 4 Wheel Drive One Ton Truck
1 International Wheeled Tractor
1 International Crawler Tractor 500
1 Bedford Personnel Truck
2 Ford Personnel Trucks
1 Toyota Landcruiser 4x4

2 Dog Teams	Sledge dogs have been a feature of New Zealand field party transportation since the Trans-Antarctic Expedition of 1957. However, motor toboggans introduced into the 1962/63 season have superceded the dog teams on long field traverses. These "tin dogs" can cover greater distances in shorter times and haul heavier loads. The dog population at Scott Base is now kept at about twenty — enough for two teams of nine dogs each, with reserves. The main work for the dog teams is in carrying out the annual penguin census, emergency operations, recreation and public relations activities.

Ground Transport: Vanda Station

2 FE 35 Ferguson Tractors.

1981/82 NEW ZEALAND ANTARCTIC RESEARCH PROGRAMME

1. SCOTT BASE AND ARRIVAL HEIGHTS

Scott Base continues to be an important link in a global chain of observing stations conducting research in geophysics, meterology, seismology and upper atmosphere physics.

Continuous Scott Base laboratory programmes will this year include:

Seismology

Sited on rock and located near to Antarctica's major mountain chain extending from Cape Adare to beyond the Beardmore Glacier southward, Scott Base is of strategic importance in Antarctic seismology. Additions made to the science laboratory in 1962/63 permitted the setting up of new American equipment, one of 120 identical instruments which the United States Coast and Geodetic Survey has given to countries throughout the world. New Zealand is responsible for three other such stations: Wellington, New Zealand, Rarotonga, Cook Islands and Apia, Samoa.

Seismology is under the aegis of the Seismological Observatory, Geophysics Division, DSIR, Wellington.

Seismic and audio studies will also be made as an integral part of the International Mt. Erebus Science Study (IMESS). Under this programme initiated by Dr. Philip Kyle of Ohio State University during the 1980/81 season a series of seismic recorders have been sited on Mt Erebus at various locations which are now monitored at Scott Base by radio telemetry on a continuous basis.

Meteorology

Routine daily climatological and surface synoptic observations, recording solar radiation and atmospheric turbidity measurements.

The N.Z. Meteorological Service will continue the Scott Base observing programme and make additional radiation measurements, including data analysis. Local climatological studies will also be made in conjunction with field parties, each of which is required to provide daily reports on location weather.

Weather observations will also be made from Vanda Station.

Ionospherics

Scott Base is one station in a world network of stations which continuously records the state of the ionosphere with a vertical incidence recorder. A panoramic ionosonde, designed and constructed in New Zealand, sweeps from 1-22 megacycles in 24 seconds at 15 minute intervals to provide data from Scott Base to be used for the prediction of radio operation frequencies. This programme is operated by the Geophysical Observatory, Physics and Engineering Laboratory, DSIR, Christchurch.

Scott Base laboratory staff will continue to monitor the ionospheric D-Region observation equipment installed by Canterbury University. For this programme, transmission equipment operates from Scott Base with the receivers located at Arrival Heights. During the season a team from Canterbury University will carry out servicing of the Antennae farm at Arrival Heights and recording equipment in the Scott Base Laboratory.

Earth Currents

During the 1964/65 season a programme measuring electric currents in the earth was established at Scott Base, as this year was the International Year of the Quiet Sun. Solar flares then reached a minimum as compared with the International Geophysical Year in 1957/58. Two sets of electrodes sunk 10 ft. deep through the permafrost were spaced 4,000 ft. apart, one for the north-south reading and one for the east-west reading. This electric current study, which results from variations in the earth's magnetic field, is one method of observing solar and ionospheric activity which has important effects on radio communication. Although earth current observations ceased in October 1974, one line which acts as an indicator of disturbance was retained to monitor magnetic activity. This programme is under the aegis of the Geophysical Observatory, P.E.L., DSIR, Christchurch.

Geomagnetism

In this standard observatory activity, two independent recording systems are used:
(a) Wide Range three-component instrument
(b) Reduced sensitivity, three-component instrument

Both instruments have La Cour magnetographs. Weekly absolute observations are also being made with the aid of a proton precession magnetometer. Geomagnetism is under the aegis of the Geophysical Observatory, P.E.L., DSIR, Christchurch.

Aluminium Corrosion

The Mechanical and Engineering Department of Canterbury University have for many years conducted an analysis and comparison programme involving exposed aluminium plates. Each year these plates are installed at Scott Base and are annually returned to Christchurch where they are compared with similar strips located throughout New Zealand, for corrosive effect. Again this season, Scott Base staff will reinstall the aluminium plates for a further twelve months exposure.

Pyschological Testing

A joint Antarctic Division, DSIR, Victoria University of Wellington, Psychology Department programme will provide an interview and counselling service for wintering team personnel which will be conducted at Scott Base.

2. VANDA STATION

New Zealand's only base on the Antarctic Continent was built in 1968 to support the intensified study of the almost ice-free Dry Valleys. Vanda Station, 130 km west of Scott Base, is ideally situated for the support of summer field parties working in the Dry Valley area.

Vanda is basically a summer only station but scientific parties wintered over in 1969, 1970 and 1974. Research programmes were carried out in the fields of meterorology, seismology, aurora, upper air physics, geomagnetism and human physiology.

This year, Vanda will again operate for the summer only. The station will be manned by a leader, one field assistant and a technician from the New Zealand Meterological Service who will be responsible for making daily weather observation reports to Scott Base.

The station will continue to play a vital logistic support and communication role for NZARP parties and U.S. helicopters operating in the Dry Valleys region.

3. CAPE BIRD

Bird Station was constructed by Scott Base personnel during the 1965/66 season. Following completion of studies on wildlife at Cape Royds, the Canterbury University Antarctic Biological Unit commenced a programme of studies on seals, Adelie penguins, McCormick skua gulls and their inter-relationships.

In the summer of 1971/72, a wet laboratory was built to facilitate the study of marine plankton and benthic research.

Bird Station will be occupied again this summer by scientists from Canterbury University who will be conducting the annual penguin census of the Cape Bird rookery. This work forms part of the New Zealand contribution to the International Survey of Antarctic Seabirds (ISAS). Soils in both uninhabited and inhabited rookeries will be sampled by scientists from the DSIR Soil Bureau.

4. CAPE ROYDS

A combined biological laboratory and sleeping hut was erected in 1963 by Scott Base staff at Cape Royds, 36 km north of Scott Base on the western side of Ross Island.

This is the location of the most southerly Adelie penguin colony in the world. The rookery has been designated by SCAR and the Treaty Nations as a "Site of Special Scientific Interest".

Biologists from Canterbury University used the hut at Cape Royds for several summer seasons as headquarters for their studies on penguins, skuas and seals.

The hut has since been transported to the Wright Valley and integrated into the buildings of Vanda Station.

A smaller summer hut has been erected at Royds for visiting researchers and will be used again this season during the annual penguin census.

5. EMERGENCY HUTS

Emergency huts, fully provisioned, are maintained at Lake Fryxell, Asgard Range, Lower Wright Valley, Miers Valley, Cape Evans and Cape Royds for use by field parties during the summer season.

HISTORIC HUT RESTORATION

On Ross Island there are three historic huts which since 1960 have been excavated and restored to an "as was" condition by New Zealand Antarctic Society volunteers and DSIR personnel, with American assistance. In 1960/61 the hut at Cape Evans, which was Captain Scott's headquarters for his last tragic expedition in 1910/13, and was the home for the Ross Sea component of Shackleton's Trans-Antarctic Expedition of 1914/17, was restored. Also the hut at Cape Royds, which was Shackleton's headquarters for his 1907/09 expedition, was made weatherproof during the 1960/61 season. Finally, in the 1963/64 season, restoration work was commenced on Scott's 1901/04 expedition hut at Hut Point.

At Cape Adare, at the northern tip of Victoria Land, are the two huts built by C. E. Borchgrevink in 1898/99 and the remains of Scott's Northern Party's hut of 1911. Scott's hut is beyond repair, but it is hoped that Borchgrevinks hut will be restored at some time in the future.

FIELD PROGRAMME

Scientific research programmes, sponsored by New Zealand Government Departments and the Universities of Auckland, Waikato, Wellington and Canterbury, will be undertaken in Antarctica during the summer season 1981/82. Involved is a wide range of disciplines including glaciology and hydrology, oceanography, geology, palaeontology, seismology, plant physiology, sedimentology, microbiology, botany, animal and marine biology and geochemistry.

Guest scientists from China, Australia, America and Japan will work on New Zealand sponsored research projects and New Zealand scientists will participate in a major U.S. expedition to Northern Victoria Land.

A New Zealand scientist and three mountaineers will accompany the West German expedition (Ganovex II) which will also be visiting the Northern Victoria Land region.

EVENT 1: Glaciology and Hydrology — Ministry of Works and Development.

A Ministry of Works and Development hydrologist will continue the monitoring programme carried out over past seasons in order to document both long and short term climatic variations in the Dry Valleys.

Studies will also be made of the flow regime of the Onyx River and level measurements taken of eight enclosed lakes, including Don Juan Pond. This is one of the world's most unique lakes having a salt content so high that it has not been known to freeze during the Antarctic winter.

The party will continue taking mass balance and ablation measurements on the Heimdall, Clark and Wright Lower Glaciers.

EVENT 2: SURVEY WORK — Department of Lands and Survey

Two surveyors from the Department of Lands and Survey will provide survey assistance to a number of field events. They will also survey lake levels and monitor McMurdo Ice Shelf movement.

At Scott Base, the surveyors will fix levels and foundation sites for the base rebuilding programme.

EVENT 3: **SEDIMENT AND PLANKTON SAMPLING — N.Z. Oceanographic Institute.**

An Oceanographic Institute scientist and technicians will continue with McMurdo Sound phytoplankton sampling studies initiated during the 1979/80 season.

EVENT 4: **VOLCANIC AND SEISMIC STUDIES — MT EREBUS — Geological Survey, DSIR, Victoria University, Geology Department.**

The summit area of Mt Erebus will be re-observed to determine the nature of earth deformation associated with monitored variations in the level of volcanic activity. Similar studies are being conducted by the N.Z. Geological Survey in the Tongariro National Park region, in New Zealand.

As part of the International Mt Erebus Science Study (IMESS), the party will record seismic activity from three stations located on the flanks of Mt Erebus which transmit signals to receivers located at Scott Base.

Two scientists from Waikato University will join the Erebus expedition to continue the examination of organisms thriving on the warm soils of the summit area.

EVENT 5: **MCMURDO SOUND SEDIMENTS — Victoria University of Wellington.**

The Antarctic Research Unit of Victoria University will complete core sampling of the McMurdo Sound sea floor and make a further study of the factors controlling the diversity and density of the foraminifera population, begun in 1978. The project will also continue to study the pattern of sediment dispersal in McMurdo Sound today.

EVENT 6: **MICROBIOLOGY AND BOTANY OF DRY VALLEY ROCK — University of Waikato.**

Waikato University scientists will continue their studies of the ecology and physiology of endolithic and sublithic algae and lichens found in the Lake Fryxell area.

An extension of this event will be a detailed study of algae on the summit area of Mt Erebus.

EVENT 7: **UPLIFT HISTORY OF TRANSANTARCTIC MOUNTAINS — Victoria University.**

This project will utilise fission track dating of apatites to investigate the detailed uplift history of the Trans Antarctic

Mountains in the Dry Valleys region of southern Victoria Land. The party, including a guest scientist from the University of Melbourne will study the thermal histories of granite intrusions exposed in the Dry Valleys.

EVENTS 8 & 9: PENGUIN CENSUS — CAPE BIRD AND CAPE ROYDS — Canterbury University and Antarctic Division, DSIR.

University of Canterbury biologists will occupy the Cape Bird hut at the time of peak Adelie penguin population in order to undertake the annual census of the rookery. This work is part of a long term study programme and constitutes a section of the New Zealand contribution to the three year International Survey of Antarctic Seabirds (ISAS).

The Cape Royds Adelie rookery will also be the subject of a census count to be taken by a joint University/Scott Base team.

EVENT 10: SURVIVAL TRAINING — Antarctic Division, DSIR.

Antarctic Division, DSIR specialist field personnel, all members of the combined U.S./N.Z. Search and Rescue team for the region, will provide survival training and instruction to all members of the New Zealand and United States Antarctic Research programmes.

EVENT 11: VIP VISITS: ANTARCTIC DIVISION, DSIR.

Two groups of VIP guests of Antarctic Division, DSIR, will visit Scott Base and Vanda Station. These visits are planned to coincide with the twentyfifth anniversary of the building of Scott Base which will be celebrated on January 20th, 1982 and the parties will comprise some of the original members of the Trans Antarctic and International Geophysical Year expeditions of 1957/58.

EVENT 12: WORKER VISITORS — Antarctic Division, DSIR.

A number of short term worker visitors from various Government Departments will visit Scott Base and Vanda Station during the season to service existing installations and carry out specialist functions.

Of particular significance will be the visit of two members of the Historic Sites Management Working Group of the Ross Dependency Research Committee, who will evaluate historic sites at Cape Evans, Cape Royds and Hut Point, in order to develop an effective management plan for future restoration and conservation.

EVENT 13: **FLOATANT POLLUTANTS AND OIL SPILLAGE VULNERABILITY INDEX — University of Auckland, Geology Department.**

Studies will be conducted, aboard a U.S. vessel en route from New Zealand to Antarctica, sampling waters of the Southern Ocean and from selected beaches down the Northern Victoria Land coast, in an attempt to make an estimation of the level of pelagic plastic and tar on the surface waters. This work is related to studies already undertaken in New Zealand coastal waters.

EVENT 14: **BBC/TVNZ DOCUMENTARY FILMING — Antarctic Division, DSIR.**

A four man BBC/TVNZ natural history film crew will film at various locations around Ross Island and in the Dry Valleys. Film content will relate to science projects currently being undertaken in the region.

EVENT 15: **DRY VALLEY GEOCHEMISTRY — JAPANESE ANTARCTIC RESEARCH EXPEDITION.**

Sponsored by Antarctic Division, DSIR, a team of four Japanese scientists will conduct their fifteenth year of geological and geochemical studies in the Dry Valleys.

EVENT 16: **LANDSAT IMAGERY — DSIR/Lands & Survey — CANCELLED**

EVENT 17: **NORTHERN VICTORIA LAND PALEOMAGNETIC AND STRUCTURAL STUDIES — N.Z. Geological Survey, DSIR. INTERNATIONAL EVENT.**

Two geologists from the New Zealand Geological Survey, DSIR plan to establish a polar wanderpath for the volcanic and sedimentary rocks of Northern Victoria Land for comparison with similar areas in Australia and New Zealand in order to further test the reconstruction of Eastern Gondwanaland. Structural studies in relation to regional tectonics and the interpretation of palaeomagnetic results will be undertaken.

EVENT 18: **NORTHERN VICTORIA LAND BEACON STUDIES — Victoria University of Wellington and University of Armidale N.S.W. Australia. INTERNATIONAL EVENT.**

This party of two geologists plan to study the Beacon Super Group of Northern Victoria Land and to investigate the paleohydrology of the Triassic part of the Beacon sequence.

EVENT 19: **NORTHERN VICTORIA LAND — BOWERS SUPER GROUP STUDIES — N.Z. Geological Survey, DSIR, University of Canterbury, Institute of Nuclear Sciences, DSIR. INTERNATIONAL EVENT.**

A four man sledging team will visit the Bowers Mountains in an attempt to define the regional extent of the Bowers Supergroup. Their studies will be related to stratigraphic structural and correlation research undertaken in the area in 1974/75.

EVENT 20: **NORTHERN VICTORIA LAND — PALEONTOLOGY — New Zealand Geological Survey, DSIR, South Australian Institute of Technology and University of Kansas. INTERNATIONAL EVENT.**

A four man sledging team will visit the central Bowers Mountains, the Leitch Massif and Mount McCarthy areas to further investigations of the various fossiliferous units begun in the 1974/75 season.

EVENT 21: **NORTHERN VICTORIA LAND — ROBERTSON BAY GROUP — Antarctic Division, DSIR, N.Z. Geological Survey. INTERNATIONAL EVENT.**

A sledging party comprising two geologists and two field staff will traverse from the Lyttelton Range through the Admiralty Range to the Millen Range in an effort to study the structural and sedimentological structure of the Robertson Bay Group rock formations.

EVENT 22: **HISTORIC HUT RESTORATION — CAPE ADARE — Canterbury Museum.**

Depending on the availability of icebreaker support, it is hoped to put a four man party ashore at Cape Adare in an attempt to assess the condition of the Scott and Borchgrevink huts so that a management plan can be formulated for possible future restoration and conservation.

EVENT 23: **YOUTH GROUP VISIT — Antarctic Division, DSIR.**

Three representatives from various Youth Groups in New Zealand will visit Scott Base and possibly Vanda Station, and will assist the base teams with general duties. The party will journey south aboard a U.S. icebreaker and return to New Zealand either by air or the resupply ship toward the end of January.

EVENT 24: **ANALYSIS OF SOIL ORGANIC MATTER — CAPE BIRD — Soil Bureau, DSIR.**

Two Soil Bureau scientists will visit Cape Bird and conduct an analysis of soil organic matter within and around the Adelie penguin rookery. In these ornithogenic soils of Antarctica there is a unique opportunity to study a very simple soil/climate system.

EVENT 25: **PHYSIOLOGY OF ANTARCTIC ECTOTHERMS**
McMurdo Sound/Cape Royds Area. Zoology Department, Auckland University.

A team of five physiologists will continue their research into the neuromuscular physiology, parasitology and demography of Ross Sea fishes.

REPORT ON NEW ZEALAND ANTARCTIC RESEARCH PROGRAMME FOR 1980/81 SUMMER AND 1981 WINTER

SCOTT BASE AND ARRIVAL HEIGHTS

At Scott Base, continuous recording programmes have been maintained in the disciplines of seismology, meterology, ionospheric physics, geomagnetism and earth currents.

An independent seismic programme initiated by Dr Philip Kyle of the Ohio State University involving the siting of recorders on the flanks of Mt. Erebus with data transmission to receivers located at Scott Base continued to operate throughout the winter of 1981.

The micropulsation programme has been discontinued at Arrival Heights. However throughout the winter months an all sky camera has been operative with the aim of obtaining a photographic record of auroral activity on behalf of the New Zealand National Film Unit.

The university of Canterbury were successful in completing the installation of an antenaae complex at Arrival Heights together with ionospheric D-region observation equipment. This programme is expected to be fully operational during the early part of the 1981/82 summer and will continue for a period of approximately 12 years.

Two guest scientists from the Geophysical Institute of Kyoto University, Japan completed their studies of gravity connection between New Zealand and Antarctica as part of their world wide research in this field.

Studies related to the transmission of flu virus were carried out with the co-operation of staff from both Scott Base and McMurdo.

Stage 3A of the Scott Base rebuilding programme was completed as scheduled with the erection of the outer frame of the new accommodation and ablutions block. All internal finishing of this building will be completed during the first half of the 1981/82 summer.

Ten men have wintered at Scott Base, maintaining the continuous science recording programmes and preparing field equipment and vehicles for use in the coming season.

VANDA STATION

Vanda Station operated as a summer support base for scientific parties working in the Dry Valleys region. The Station opened on 25th October 1980 and closed on 28th January 1981.

Staffed by three men throughout the season the station again provided vital logistics and communications support for field parties and United States helicopters operating in the region. A limited meteorological programme was successfully completed and two scientists from the State University of New York conducted studies from Vanda, of the Aerosol Column and meteorological variations of Antarctic Aerosols.

FIELD PROGRAMME 1980/81 REPORT

EVENT 1: GLACIOLOGY AND HYDROLOGY

Hydrologists from the Water and Soil Division of the Ministry of Works and Development continued their studies of the Onyx River flow regime and a comparative climatic study was made of the margin of the Wright Lower Glacier, the source area of the Onyx River.

Lake levels were monitored on Lakes Vanda, House, Henderson, Hoare, Fryxell, Bonney and Joyce and mass balance measurements taken of a number of Dry Valleys glaciers, in order to document both long and short term climatic variations in the Dry Valleys.

An automatic water level recorder was installed on Don Juan Pond to determine water level fluctuations during summer and winter months.

A number of ablation measurement poles were replaced and an additional 12 poles extended the Upper Wright Glacier network. Measurements were also taken from fixed points at the Meserve Glacier to determine the rate of recession of the glacier snout.

EVENT 2: GEOLOGICAL STUDIES — FERRAR GLACIER

Sponsored by Antarctic Division, DSIR, a four man sledging expedition carried out a structural and metamorphic analysis of basement rocks in the Ferrar Glacier region. Geological studies were made of both sides of the Ferrar Glacier and as far as the Cavendish Icefalls at the confluence of the Taylor and Ferrar Glaciers. Comparative rock samples were also taken from the Dias and Lake Vida areas.

EVENT 3: SURVEY WORK

Two surveyors from the Department of Lands and Survey carried out a number of survey projects throughout the summer providing assistance to field parties working in the Dry Valleys, the Erebus Ice Tongue and the summit area of Mt Erebus. Surveys were also completed of the ground areas at Scott Base involved in the base rebuilding programme. Annual monitoring of McMurdo Ice Shelf movement was successfully completed.

EVENT 4: BIOCHEMICAL STUDIES — LAKE VANDA

An investigation of the factors controlling algae production in Lake Vanda and the measurement of microbial transformations of nitrogen throughout the water column was successfully completed by Ecology Division, DSIR. In addition, a preliminary study was made of plankton nutrient status in lakes and ponds on Ross Island.

EVENT 5: MT EREBUS VOLCANOLOGICAL STUDIES — INTERNATIONAL EVENT 2

Despite extremely poor weather conditions throughout the month long period of the Erebus expedition, the science programme was completed. This included paleomagnetic sampling around the summit lava flows; seismic and magnetic studies as part of the International Mt Erebus Seismic Study programme (IMESS). Observations of the lava and petrological examination of volcanic ejecta were made and the summit area was the subject of a precise survey to establish a basis for future annual observations of earth deformation associated with volcanic activity, and for the production of a detailed contour map of the region.

EVENT 9: MARINE GRAVITY SURVEY AND SEISMIC PROFILING — ROSS SEA — MCMURDO SOUND

New Zealand Government charter of the M.V. Benjamin Bowring enabled a joint party from the New Zealand Oceanographic Institute, Victoria University and Geophysics Division, DSIR to conduct a marine gravity and seismic profiling study of the Eastern Ross Sea, Western Ross Sea, Northern Victoria Land Coast and McMurdo Sound. Additionally the group was able to obtain paleomagnetic samples and make gravity observations on Ross Island and in the Wright Valley.

EVENT 10/11: RECONNAISSANCE AND REMOTE SENSING — NORTHERN VICTORIA LAND

A successful reconnaissance flight was made by a U.S. C130 Hercules aircraft over the Bowers Mountains region of Northern Victoria Land in order to determine suitable base camp sites for the 1981/82 International expedition. Lands and Survey and DSIR personnel were on board this flight and subsequently have provided valuable site and route information for use by New Zealand sledging parties likely to be involved with the proposed expedition.

Physics and Engineering Laboratory, DSIR staff were able to obtain valuable comparative information related to the 1973 Landsat satellite imagery particularly in respect of topographic and ice conditions existing in Northern Victoria Land.

EVENT 12: BIOMASS STUDIES

Scientists from the Botany Department, Canterbury University conducted biomass and nitrogen fixation studies in the Taylor Valley and at Cape Bird. They also undertook a penguin census at Cape Bird.

EVENT 13: BEACON STUDIES

Visiting the areas of Mts Fleming, Crean and Bastion, scientists from Victoria University continued with their programme of obtaining samples of Permian and Triassic plant fossils. They also took magnetic measurements to assist in determining ancient pole positions.

EVENT 14: MCMURDO SOUND SEDIMENTS — FAUNA AND FLORA

Victoria University scientists collected sediment samples from the floor of McMurdo Sound in order to relate sediment and faunal content to present day geography.

EVENT 15: BASEMENT STUDIES — MIERS VALLEY

Geologists from Victoria University and Antarctic Division, DSIR carried out a detailed study of petrology and geochemistry of the granitic and metasedimentary complex between the Miers and Salmon Valleys and McMurdo Sound. Subsequently a detailed geological map has been prepared based on field observations at a scale of 1:25,000.

EVENT 16: SEA ICE AND GLACIER TONGUE DYNAMICS

Two specific research programmes were undertaken by scientists from the University of Waikato which involved investigating the physical properties of both sea ice and floating glacier ice. Additionally, some wave data was recorded on the McMurdo ice runway and a 24 hour solar flux recording taken at Lake Fryxell.

EVENT 17: PLANT PHYSIOLOGY

Waikato University scientists continued their studies of the physiology and productivity of plant communities and carried out microbiological sampling of Lakes Fryxell and Vanda and Don Juan Pond. Research is continuing of algae found in the Mt Erebus fumeroles.

EVENT 21: DRY VALLEY MAGNETOSTRATIGRAPHY — INTERNATIONAL EVENT

New Zealand scientists and survey personal participated in the U.S. National Science Foundation project which studied the stratigraphy and age of surface units in the Eastern Taylor Valley and their correlation with upper strata recovered in earlier drilling programmes — DVDP 8 and 11.

EVENT 22: INTERNATIONAL BIOMEDICAL EXPEDITION TO ANTARCTICA

New Zealand contributed two scientists to this international project which was successfully completed. A detailed analysis of the results is being carried out by the French Antarctic Research programme which sponsored the expedition and a detailed report is expected to be issued shortly.

EVENT 23: PENGUIN CENSUS — CAPE ROYDS

Scott Base staff completed the annual penguin census at Cape Royds, designated a site of special scientific interest. Details of observations, census figures etc. are annually reported to the Scientific Committee on Antarctic Research (SCAR) and all Treaty Nations.

EVENT 24: SURVIVAL TRAINING

Antarctic Division, DSIR specialist field personnel provided essential survival training and instruction in snowcraft to all field party members of the New Zealand and U.S. Antarctic Research Programmes.

EVENT 25: PSYCHOLOGICAL STUDIES

Psychological testing and counselling services were conducted by Prof. Tony Taylor of Victoria University as part of an ongoing programme involving all wintering personnel at Scott Base.

EVENT 26: SEAL CENSUS — MCMURDO SOUND

To avoid a duplication of effort, the annual McMurdo seal census has been deleted from the New Zealand programme and will in future be conducted by the U.S. National Science Foundation.

EVENT 27: JAPANESE ANTARCTIC RESEARCH EXPEDITION

Three Japanese scientists undertook their 14th successive year of geological and geochemical studies in the Dry Valleys region.

EVENT 28: WORKER VISITORS

A number of short term worker visitor personnel from New Zealand Government Departments visited Scott Base and Vanda Station to carry out a variety of specialist tasks and installation servicing during the summer season.

EVENT 30: VIP VISITOR GROUPS

Two groups of VIP guests of Antarctic Division, DSIR visited Scott Base and Vanda Station and were able to witness a cross section of scientific research being undertaken in Antarctica under the auspices of the New Zealand Antarctic Research Programme.

EVENT 32: NATIONAL FILM UNIT

A team from the New Zealand National Film Unit again visited Scott Base and selected field parties, enabling them to complete a documentary film on New Zealand Antarctic activities.

THE FUTURE

Whilst basic scientific studies continue in the Antarctic there is developing emphasis being directed towards meeting the more specialised demands of man's increasing knowledge of the region and the balanced utilisation of resources.

Antarctica has retained its IGY status as a unique natural laboratory where man can study the earth and surrounding space. Equally important, the continent continues to be the last relatively undisturbed area of earth from which may also be monitored the effect of man on the remainder of our global environment.

NOTES

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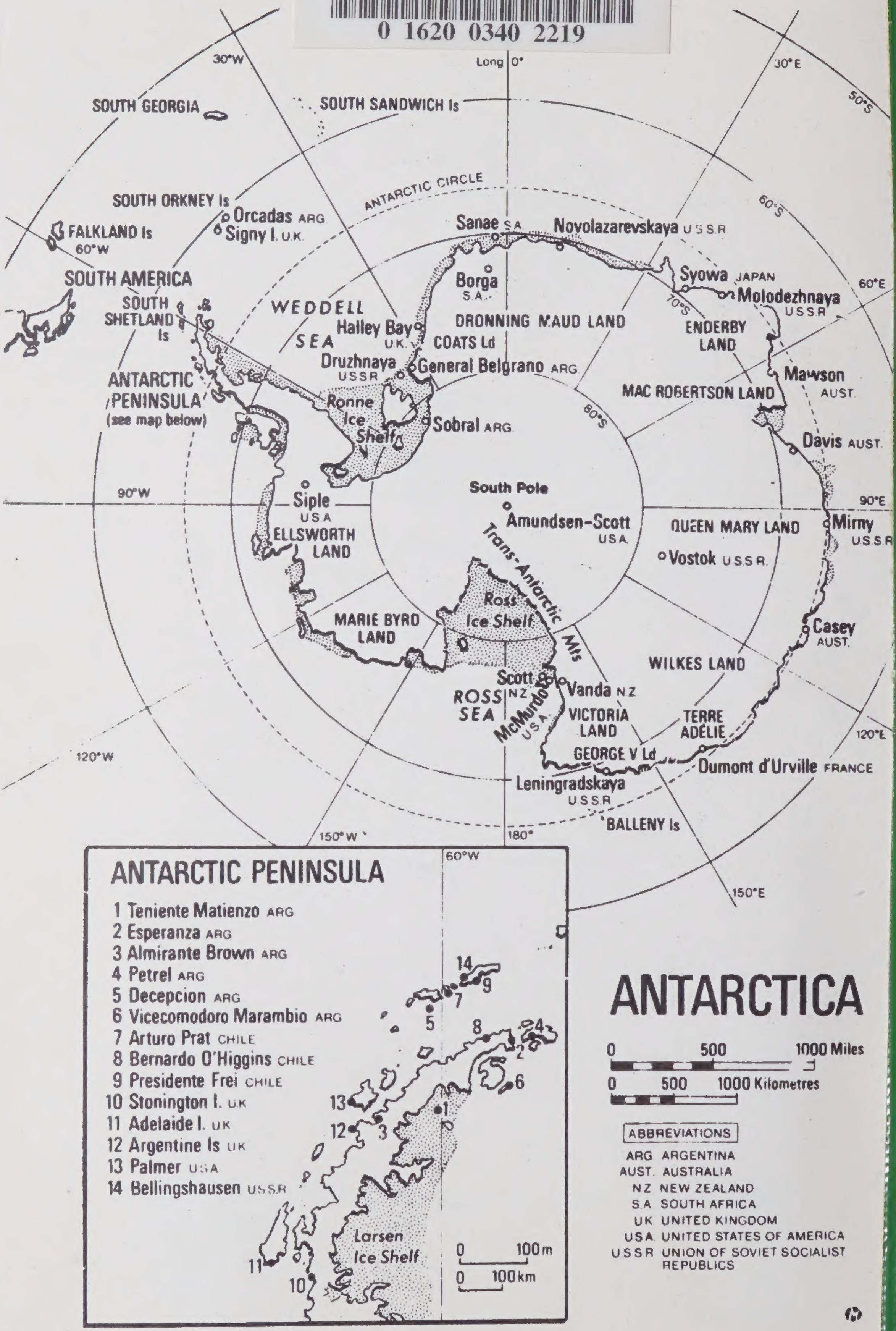

ANTARCTICA Selected Stations and Physical Features